



SOCKET NO. P05842 (NATI15-05842)
Customer No. 23990

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: : SERGEI DRIZLIKH ET AL.
Serial No. : 10/821,491
Filed : April 9, 2004
For : SYSTEM AND METHOD FOR MINIMIZING INCREASES
IN VIA RESISTANCE BY APPLYING A NITROGEN
PLASMA AFTER A TITANIUM LINER DEPOSITION
Group No. : 2812
Examiner : Lynne Ann Gurley

MAIL STOP AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

CERTIFICATE OF MAILING BY FIRST CLASS MAIL

The undersigned hereby certifies that the following documents:

1. Postcard receipt; and
2. Response to Restriction Requirement

relating to the above application, were deposited as "First Class Mail" with the United States Postal Service, addressed to, MAIL STOP AMENDMENT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on November 23, 2004.

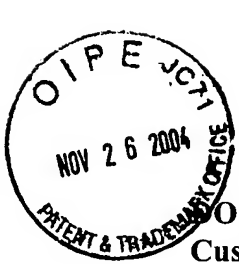
Date: 11/23/04

Kathy Ceder
Mailer

Date: Nov. 23, 2004

William A. Munck
William A. Munck
Reg. No. 39,308

P.O. Drawer 800889
Dallas, Texas 75380
Phone: (972) 628-3600
Fax: (972) 628-3616
E-mail: wmunck@davismunck.com



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RESPONSE TO RESTRICTION REQUIREMENT

A Restriction Requirement was mailed in the present patent application on October 26, 2004 with time period for response ending on November 26, 2004.

In response to the Restriction Requirement, the Applicant provisionally elects the claims of Group I, Claims 1-12, WITH TRAVERSE.

The Restriction Requirement characterizes Claims 1-12 (Group I) as drawn to "a method of making a semiconductor device" and Claims 13-20 (Group II) as drawn to "a semiconductor device." (Restriction Requirement, Page 2). The Applicants respectfully submit that the Restriction

Requirement provides no factual basis for asserting either independence or distinctness of these claims. The Restriction Requirement makes the following statements:

The inventions are distinct, each from the other because of the following reasons: Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the process as claimed can be used to make other and materially different product, i.e., product which does not require a metal layer placed over the substrate. (Restriction Requirement, Page 2).

A restriction requirement must provide the particular factual basis for asserting that restriction is necessary:

The particular reasons relied on by the examiner for holding that the inventions as claimed are either independent or distinct should be concisely stated. A mere statement of conclusion is inadequate. The reasons upon which the conclusion is based should be given. (MPEP § 816, p. 800-56 (8th ed. rev. 1 February 2003)).

The Restriction Requirement fails to provide such a factual basis (as opposed to a “mere statement of conclusion”) indicating why the claims recite patentably distinct species--that is, a factual basis for asserting that: “the process as claimed can be used to make other and materially different product.” The Examiner does not identify how the process is capable of making an allegedly “materially different product” that does not require a metal layer placed over a substrate.

The Applicants respectfully traverse the Examiner’s conclusion for the following reasons. Restriction is only proper where the claims are independent or distinct. MPEP § 806. In passing on questions of restriction, the claimed subject matter must be compared in order to determine

distinctness and independence. MPEP § 806.01, p. 800-39. The Restriction Requirement concedes that the claims are not independent but are related (“Inventions I and II are related as process of making and product made”) (Emphasis added) (Restriction Requirement, Page 2).

Claim 1 is directed to a method as follows:

1. In a semiconductor device of the type comprising a via wherein said via comprises a layer of titanium placed over a layer of anti-reflective coating (ARC) titanium nitride, a method for preventing a contaminant within said layer of anti-reflective coating (ARC) titanium nitride from combining with portions of said layer of titanium, said method comprising the steps of:

applying a nitrogen plasma to said layer of titanium; and
converting said layer of titanium to a first layer of titanium nitride;
wherein said contaminant does not chemically react with said first layer of titanium nitride.

Claim 13 is directed to a semiconductor device that requires the use of the method as claimed in Claim 1:

13. A semiconductor device comprising a via through said semiconductor device, said semiconductor device comprising:
a substrate of said semiconductor device;
a metal layer placed over said substrate;
a layer of anti-reflective coating (ARC) titanium nitride placed over said metal layer;

a dielectric layer placed over said layer of anti-reflective coating (ARC) titanium nitride;

wherein portions of said dielectric layer are etched and portions of said layer of anti-reflective coating (ARC) titanium nitride are partially etched to form a via passage; and

a layer of titanium deposited over exposed portions of said dielectric layer and deposited over exposed portions of said layer of anti-reflective coating (ARC) titanium nitride;

wherein said layer of titanium is converted to a first layer of titanium nitride by applying a nitrogen plasma to said layer of titanium.

From the foregoing, the Applicants respectfully submit that it is clear that only a method of the type claimed in Claim 1 can form the structure as claimed in Claim 13. That is, there is not “another materially different product” that can be made by the method of the invention as claimed in the Group I claims. Therefore, the Restriction Requirement accordingly has failed to establish that the method as claimed in Claims 1-12 could be used to make another materially different product than the product as claimed in Claims 13-20.

With regard to the assertion that “Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper,” the Restriction Requirement fails to provide any factual basis for such conclusion.

With respect to distinctness of the Group I Claims (Claims 1-12) from the Group II Claims (Claims 13-20), the Restriction Requirement fails to satisfy any of the requirements for restricting the claims of the patent application. Accordingly, the Applicants respectfully request that the restriction be withdrawn.

SUMMARY


If any issue arises, or if the Examiner has any suggestions for expediting allowance of this application, the Applicants respectfully invite the Examiner to contact the undersigned at the telephone number indicated below or at *wmunck@davismunck.com*.

The Commissioner is hereby authorized to charge any additional fees connected with this communication or credit any overpayment to Deposit Account No. 50-0208.

Respectfully submitted,

DAVIS MUNCK, P.C.

Date: Nov. 23, 2004



William A. Munck
Registration No. 39,308

P.O. Box 802432
Dallas, Texas 75380
Phone: (972) 628-3600
Fax: (972) 628-3616
E-mail: *wmunck@davismunck.com*